

SEQUENCE LISTING

<110> Apicella, M. A.
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<120> Vaccine and compositions for the
 prevention and treatment of Neisserial infections

<130> 875.045US1

<150> US 60/344,452

<151> 2001-10-23

<150> US 60/310,356

<151> 2001-08-06

<150> US 60/266,070

<151> 2001-01-31

<160> 12

<210> 1

<211> 2015

<212> PRT

<213> Neisseria gonorrhoeae

<400> 1

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Met	Val	Ala	Val	Ala	Glu	Thr	Ala	Asn	Ser	Gln	Gly	Lys	Gly	Lys	Gln
			20					25					30		
Ala	Gly	Ser	Ser	Val	Ser	Val	Ser	Leu	Lys	Thr	Ser	Gly	Asp	Leu	Cys
		35					40					45			
Gly	Lys	Leu	Lys	Thr	Thr	Leu	Lys	Thr	Leu	Val	Cys	Ser	Leu	Val	Ser
	50					55					60				
Leu	Ser	Met	Val	Leu	Pro	Ala	His	Ala	Gln	Ile	Thr	Thr	Asp	Lys	Ser
65				70					75					80	
Ala	Pro	Lys	Asn	Gln	Gln	Val	Val	Ile	Leu	Lys	Thr	Asn	Thr	Gly	Ala
			85					90					95		
Pro	Leu	Val	Asn	Ile	Gln	Thr	Pro	Asn	Gly	Arg	Gly	Leu	Ser	His	Asn
		100					105						110		
Arg	Tyr	Thr	Gln	Phe	Asp	Val	Asp	Asn	Lys	Gly	Ala	Val	Leu	Asn	Asn
	115						120					125			
Asp	Arg	Asn	Asn	Asn	Pro	Phe	Leu	Val	Lys	Gly	Ser	Ala	Gln	Leu	Ile
	130					135				140					
Leu	Asn	Glu	Val	Arg	Gly	Thr	Ala	Ser	Lys	Leu	Asn	Gly	Ile	Val	Thr
145				150					155					160	
Val	Gly	Gly	Gln	Lys	Ala	Asp	Val	Ile	Ile	Ala	Asn	Pro	Asn	Gly	Ile
			165					170					175		
Thr	Val	Asn	Gly	Gly	Gly	Phe	Lys	Asn	Val	Gly	Arg	Gly	Ile	Leu	Thr
		180					185						190		
Ile	Gly	Ala	Pro	Gln	Ile	Gly	Lys	Asp	Gly	Ala	Leu	Thr	Gly	Phe	Asp
	195					200					205				
Val	Arg	Gln	Gly	Thr	Leu	Thr	Val	Gly	Ala	Ala	Gly	Trp	Asn	Asp	Lys
	210					215					220				

Gly	Gly	Ala	Asp	Tyr	Thr	Gly	Val	Leu	Ala	Arg	Ala	Val	Ala	Leu	Gln	225	230	235	240
Gly	Lys	Leu	Gln	Gly	Lys	Asn	Leu	Ala	Val	Ser	Thr	Gly	Pro	Gln	Lys	245	250	255	
Val	Asp	Tyr	Ala	Ser	Gly	Glu	Ile	Ser	Ala	Gly	Thr	Ala	Ala	Gly	Thr	260	265	270	
Lys	Pro	Thr	Ile	Ala	Leu	Asp	Thr	Ala	Ala	Leu	Gly	Gly	Met	Tyr	Ala	275	280	285	
Asp	Ser	Ile	Thr	Leu	Ile	Ala	Asn	Glu	Lys	Gly	Val	Gly	Val	Lys	Asn	290	295	300	
Ala	Gly	Thr	Leu	Glu	Ala	Ala	Lys	Gln	Leu	Ile	Val	Thr	Ser	Ser	Gly	305	310	315	320
Arg	Ile	Glu	Asn	Ser	Gly	Arg	Ile	Ala	Thr	Thr	Ala	Asp	Gly	Thr	Glu	325	330	335	
Ala	Ser	Pro	Thr	Tyr	Leu	Ser	Ile	Glu	Thr	Thr	Glu	Lys	Gly	Ala	Ala	340	345	350	
Gly	Thr	Phe	Ile	Ser	Asn	Gly	Gly	Arg	Ile	Glu	Ser	Lys	Gly	Leu	Leu	355	360	365	
Val	Ile	Glu	Thr	Gly	Glu	Asp	Ile	Ser	Leu	Arg	Asn	Gly	Ala	Val	Val	370	375	380	
Gln	Asn	Asn	Gly	Ser	Arg	Pro	Ala	Thr	Thr	Val	Leu	Asn	Ala	Gly	His	385	390	395	400
Asn	Leu	Val	Ile	Glu	Ser	Lys	Thr	Asn	Val	Asn	Asn	Ala	Lys	Gly	Ser	405	410	415	
Ala	Asn	Leu	Ser	Ala	Gly	Gly	Arg	Thr	Thr	Ile	Asn	Asp	Ala	Thr	Ile	420	425	430	
Gln	Ala	Gly	Ser	Ser	Val	Tyr	Ser	Ser	Thr	Lys	Gly	Asp	Thr	Glu	Leu	435	440	445	
Gly	Glu	Asn	Thr	Arg	Ile	Ile	Ala	Glu	Asn	Val	Thr	Val	Leu	Ser	Asn	450	455	460	
Gly	Ser	Ile	Gly	Ser	Ala	Ala	Val	Ile	Glu	Ala	Lys	Asp	Thr	Ala	His	465	470	475	480
Ile	Glu	Ser	Gly	Lys	Pro	Leu	Ser	Leu	Glu	Thr	Ser	Thr	Val	Ala	Ser	485	490	495	
Asn	Ile	Arg	Leu	Asn	Asn	Gly	Asn	Ile	Lys	Gly	Gly	Lys	Gln	Leu	Ala	500	505	510	
Leu	Leu	Ala	Asp	Asp	Asn	Ile	Thr	Ala	Lys	Thr	Thr	Asn	Leu	Asn	Thr	515	520	525	
Pro	Gly	Asn	Leu	Tyr	Val	His	Thr	Gly	Lys	Asp	Leu	Asn	Leu	Asn	Val	530	535	540	
Asp	Lys	Asp	Leu	Ser	Ala	Ala	Ser	Ile	His	Leu	Lys	Ser	Asp	Asn	Ala	545	550	555	560
Ala	His	Ile	Thr	Gly	Thr	Ser	Lys	Thr	Leu	Thr	Ala	Ser	Lys	Asp	Met	565	570	575	
Gly	Val	Glu	Ala	Gly	Leu	Leu	Asn	Val	Thr	Asn	Thr	Asn	Leu	Arg	Thr	580	585	590	
Asn	Ser	Gly	Asn	Leu	His	Ile	Gln	Ala	Ala	Lys	Gly	Asn	Ile	Gln	Leu	595	600	605	
Arg	Asn	Thr	Lys	Leu	Asn	Ala	Ala	Lys	Ala	Leu	Glu	Thr	Thr	Ala	Leu	610	615	620	
Gln	Gly	Asn	Ile	Val	Ser	Asp	Gly	Leu	His	Ala	Val	Ser	Ala	Asp	Gly	625	630	635	640
His	Val	Ser	Leu	Leu	Ala	Asn	Gly	Asn	Ala	Asp	Phe	Thr	Gly	His	Asn	645	650	655	
Thr	Leu	Thr	Ala	Lys	Ala	Asp	Val	Asn	Ala	Gly	Ser	Val	Gly	Lys	Gly	660	665	670	
Arg	Leu	Lys	Ala	Asp	Asn	Thr	Asn	Ile	Thr	Ser	Ser	Ser	Gly	Asp	Ile	675	680	685	

Thr Leu Val Ala Gly Asn Gly Ile Gln Leu Gly Asp Gly Lys Gln Arg
 690 695 700
 Asn Ser Ile Asn Gly Lys His Ile Ser Ile Lys Asn Asn Gly Gly Asn
 705 710 715 720
 Ala Asp Leu Lys Asn Leu Asn Val His Ala Lys Ser Gly Ala Leu Asn
 725 730 735
 Ile His Ser Asp Arg Ala Leu Ser Ile Glu Asn Thr Lys Leu Glu Ser
 740 745 750
 Thr His Asn Thr His Leu Asn Ala Gln His Glu Arg Val Thr Leu Asn
 755 760 765
 Gln Val Asp Ala Tyr Ala His Arg His Leu Ser Ile Thr Gly Ser Gln
 770 775 780
 Ile Trp Gln Asn Asp Lys Leu Pro Ser Ala Asn Lys Leu Val Ala Asn
 785 790 795 800
 Gly Val Leu Ala Leu Asn Ala Arg Tyr Ser Gln Ile Ala Asp Asn Thr
 805 810 815
 Thr Leu Arg Ala Gly Ala Ile Asn Leu Thr Ala Gly Thr Ala Leu Val
 820 825 830
 Lys Arg Gly Asn Ile Asn Trp Ser Thr Val Ser Thr Lys Thr Leu Glu
 835 840 845
 Asp Asn Ala Glu Leu Lys Pro Leu Ala Gly Arg Leu Asn Ile Glu Ala
 850 855 860
 Gly Ser Gly Thr Leu Thr Ile Glu Pro Ala Asn Arg Ile Ser Ala His
 865 870 875 880
 Thr Asp Leu Ser Ile Lys Thr Gly Gly Lys Leu Leu Leu Ser Ala Lys
 885 890 895
 Gly Gly Asn Ala Gly Ala Pro Ser Ala Gln Val Ser Ser Leu Glu Ala
 900 905 910
 Lys Gly Asn Ile Arg Leu Val Thr Gly Glu Thr Asp Leu Arg Gly Ser
 915 920 925
 Lys Ile Thr Ala Gly Lys Asn Leu Val Val Ala Thr Thr Lys Gly Lys
 930 935 940
 Leu Asn Ile Glu Ala Val Asn Asn Ser Phe Ser Asn Tyr Phe Pro Thr
 945 950 955 960
 Gln Lys Ala Ala Glu Leu Asn Gln Lys Ser Lys Glu Leu Glu Gln Gln
 965 970 975
 Ile Ala Gln Leu Lys Lys Ser Ser Pro Lys Ser Lys Leu Ile Pro Thr
 980 985 990
 Leu Gln Glu Glu Arg Asp Arg Leu Ala Phe Tyr Ile Gln Ala Ile Asn
 995 1000 1005
 Lys Glu Val Lys Gly Lys Lys Pro Lys Gly Lys Glu Tyr Leu Gln Ala
 1010 1015 1020
 Lys Leu Ser Ala Gln Asn Ile Asp Leu Ile Ser Ala Gln Gly Ile Glu
 1025 1030 1035 1040
 Ile Ser Gly Ser Asp Ile Thr Ala Ser Lys Lys Leu Asn Leu His Ala
 1045 1050 1055
 Ala Gly Val Leu Pro Lys Ala Ala Asp Ser Glu Ala Ala Ala Ile Leu
 1060 1065 1070
 Ile Asp Gly Ile Thr Asp Gln Tyr Glu Ile Gly Lys Pro Thr Tyr Lys
 1075 1080 1085
 Ser His Tyr Asp Lys Ala Ala Leu Asn Lys Pro Ser Arg Leu Thr Gly
 1090 1095 1100
 Arg Thr Gly Val Ser Ile His Ala Ala Ala Leu Asp Asp Ala Arg
 1105 1110 1115 1120
 Ile Ile Ile Gly Ala Ser Glu Ile Lys Ala Pro Ser Gly Ser Ile Asp
 1125 1130 1135
 Ile Lys Ala His Ser Asp Ile Val Leu Glu Ala Gly Gln Asn Asp Ala
 1140 1145 1150

Tyr Thr Phe Leu Lys Thr Lys Gly Lys Ser Gly Lys Ile Ile Arg Lys
 1155 1160 1165
 Thr Lys Phe Thr Ser Thr Arg Asp His Leu Ile Met Pro Ala Pro Val
 1170 1175 1180
 Glu Leu Thr Ala Asn Gly Ile Thr Leu Gln Ala Gly Gly Asn Ile Glu
 1185 1190 1195 1200
 Ala Asn Thr Thr Arg Phe Asn Ala Pro Ala Gly Lys Val Thr Leu Val
 1205 1210 1215
 Ala Gly Glu Glu Leu Gln Leu Leu Ala Glu Glu Gly Ile His Lys His
 1220 1225 1230
 Glu Leu Asp Val Gln Lys Ser Arg Arg Phe Ile Gly Ile Lys Val Gly
 1235 1240 1245
 Lys Ser Asn Tyr Ser Lys Asn Glu Leu Asn Glu Thr Lys Leu Pro Val
 1250 1255 1260
 Arg Val Val Ala Gln Thr Ala Ala Thr Arg Ser Gly Trp Asp Thr Val
 1265 1270 1275 1280
 Leu Glu Gly Thr Glu Phe Lys Thr Thr Leu Ala Gly Ala Asp Ile Gln
 1285 1290 1295
 Ala Gly Val Gly Glu Lys Ala Arg Val Asp Ala Lys Ile Ile Leu Lys
 1300 1305 1310
 Gly Ile Val Asn Arg Ile Gln Ser Glu Glu Lys Leu Glu Thr Asn Ser
 1315 1320 1325
 Thr Val Trp Gln Lys Gln Ala Gly Arg Gly Ser Thr Ile Glu Thr Leu
 1330 1335 1340
 Lys Leu Pro Ser Phe Glu Ser Pro Thr Pro Pro Lys Leu Ser Ala Pro
 1345 1350 1355 1360
 Gly Gly Tyr Ile Val Asp Ile Pro Lys Gly Asn Leu Lys Thr Glu Ile
 1365 1370 1375
 Glu Lys Leu Ser Lys Gln Pro Glu Tyr Ala Tyr Leu Lys Gln Leu Gln
 1380 1385 1390
 Val Ala Lys Asn Ile Asn Trp Asn Gln Val Gln Leu Ala Tyr Asp Arg
 1395 1400 1405
 Trp Asp Tyr Lys Gln Glu Gly Leu Thr Glu Ala Gly Ala Ala Ile Ile
 1410 1415 1420
 Ala Leu Ala Val Thr Val Thr Ser Gly Ala Gly Thr Gly Ala Val
 1425 1430 1435 1440
 Leu Gly Leu Asn Gly Ala Ala Ala Ala Thr Asp Ala Ala Phe Ala
 1445 1450 1455
 Ser Leu Ala Ser Gln Ala Ser Val Ser Phe Ile Asn Asn Lys Gly Asp
 1460 1465 1470
 Val Gly Lys Thr Leu Lys Glu Leu Gly Arg Ser Ser Thr Val Lys Asn
 1475 1480 1485
 Leu Val Val Ala Ala Ala Thr Ala Gly Val Ala Asp Lys Ile Gly Ala
 1490 1495 1500
 Ser Ala Leu Asn Asn Val Ser Asp Lys Gln Trp Ile Asn Asn Leu Thr
 1505 1510 1515 1520
 Val Asn Leu Ala Asn Ala Gly Ser Ala Ala Leu Ile Asn Thr Ala Ile
 1525 1530 1535
 Asn Gly Gly Ser Leu Lys Asp Asn Leu Gly Asp Ala Ala Leu Gly Ala
 1540 1545 1550
 Ile Val Ser Thr Val His Gly Glu Val Ala Ser Lys Ile Lys Phe Asn
 1555 1560 1565
 Leu Ser Glu Asp Tyr Ile Thr His Lys Ile Ala His Ala Ile Ala Gly
 1570 1575 1580
 Cys Ala Ala Ala Ala Ala Asn Lys Gly Lys Cys Gln Asp Gly Ala Ile
 1585 1590 1595 1600
 Gly Ala Ala Val Gly Glu Ile Val Gly Glu Ala Leu Thr Asn Gly Lys
 1605 1610 1615

Asn Pro Ala Thr Leu Thr Ala Lys Glu Arg Glu Gln Ile Leu Ala Tyr
 1620 1625 1630
 Ser Lys Leu Val Ala Gly Thr Val Ser Gly Val Val Gly Gly Asp Val
 1635 1640 1645
 Asn Thr Ala Ala Asn Ala Ala Lys Val Ala Ile Glu Asn Asn Leu Leu
 1650 1655 1660
 Ser Gln Glu Glu Tyr Ala Leu Arg Glu Lys Leu Ile Lys Lys Ala Lys
 1665 1670 1675 1680
 Gly Lys Gly Leu Leu Ser Leu Asp Trp Gly Ser Leu Thr Glu Gln Glu
 1685 1690 1695
 Ala Arg Gln Phe Ile Tyr Leu Ile Glu Lys Asp Arg Tyr Ser Asn Gln
 1700 1705 1710
 Leu Leu Asp Arg Tyr Gln Lys Asn Pro Ser Ser Leu Asn Asn Gln Glu
 1715 1720 1725
 Lys Asn Ile Leu Ala Tyr Phe Ile Asn Gln Thr Ser Gly Gly Asn Thr
 1730 1735 1740
 Ala Trp Ala Ala Ser Ile Leu Lys Thr Pro Gln Ser Met Gly Asn Leu
 1745 1750 1755 1760
 Thr Ile Pro Ser Lys Asp Ile Asn Asn Thr Leu Ser Lys Ala Tyr Gln
 1765 1770 1775
 Thr Leu Ser Arg Tyr Asp Ser Phe Asp Tyr Lys Ser Ala Val Ala Ala
 1780 1785 1790
 Gln Pro Ala Leu Tyr Leu Leu Asn Gly Pro Leu Gly Phe Ser Val Lys
 1795 1800 1805
 Ala Ala Thr Val Ala Ala Gly Gly Tyr Asn Ile Gly Gln Gly Ala Lys
 1810 1815 1820
 Ala Ile Ser Asn Gly Glu Tyr Leu His Gly Thr Val Gln Val Val Asn
 1825 1830 1835 1840
 Gly Thr Leu Met Val Ala Gly Ser Val Ser Ala Gln Ala Ala Ile Ser
 1845 1850 1855
 Ala Lys Pro Ala Pro Val Thr Arg Tyr Leu Ser Asn Asp Ser Ala Pro
 1860 1865 1870
 Ala Leu Arg Gln Ala Leu Thr Ala Glu Ser Gln Arg Ile Arg Met Lys
 1875 1880 1885
 Leu Pro Glu Glu Tyr Arg Gln Ile Gly Asn Leu Ala Ile Ala Lys Ile
 1890 1895 1900
 Asp Val Lys Gly Leu Pro Gln Arg Met Glu Ala Phe Ser Ser Phe Gln
 1905 1910 1915 1920
 Lys Gly Glu His Gly Phe Ile Ser Leu Pro Glu Thr Lys Ile Phe Lys
 1925 1930 1935
 Pro Ile Ser Val Asp Lys Tyr His Asn Ile Ala Ser Pro Pro Arg Gly
 1940 1945 1950
 Thr Leu Arg Asn Ile Asp Gly Glu Tyr Lys Leu Leu Glu Thr Ile Ala
 1955 1960 1965
 Gln Gln Leu Gly Asn Asn Arg Asn Val Ser Gly Arg Ile Asp Leu Phe
 1970 1975 1980
 Thr Glu Leu Lys Ala Cys Gln Ser Cys Ser Asn Val Ile Leu Glu Phe
 1985 1990 1995 2000
 Arg Asn Arg Tyr Pro Asn Ile Gln Leu Asn Ile Phe Thr Gly Lys
 2005 2010 2015

<210> 2
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 <212> PRT
 <213> Neisseria gonorrhoeae

<400> 2

Tyr Asp Lys Ala Leu Ile Asp Arg Glu Asn Tyr Tyr Asn His Pro Leu
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 Pro Asp Leu Gly Ala His Arg Gln Thr Ala Arg Ser Phe Ala Leu Ser
 485 490 495
 Gly Asn Trp Tyr Phe Thr Pro Gln His Lys Leu Ser Leu Thr Ala Ser
 500 505 510
 His Gln Glu Arg Leu Pro Ser Thr Gln Glu Leu Tyr Ala His Gly Lys
 515 520 525
 His Val Ala Thr Asn Thr Phe Glu Val Gly Asn Lys His Leu Asn Lys
 530 535 540
 Glu Arg Ser Asn Asn Ile Glu Leu Ala Leu Gly Tyr Glu Gly Asp Arg
 545 550 555 560
 Trp Gln Tyr Asn Leu Ala Leu Tyr Arg Asn Arg Phe Gly Asn Tyr Ile
 565 570 575
 Tyr Ala Gln Thr Leu Asn Asp Gly Arg Gly Pro Lys Ser Ile Glu Asp
 580 585 590
 Asp Ser Glu Met Lys Leu Val Arg Tyr Asn Gln Ser Gly Ala Asp Phe
 595 600 605
 Tyr Gly Ala Glu Gly Glu Ile Tyr Phe Lys Pro Thr Pro Arg Tyr Arg
 610 615 620
 Ile Gly Val Ser Gly Asp Tyr Val Arg Gly Arg Leu Lys Asn Leu Pro
 625 630 635 640
 Ser Leu Pro Gly Arg Glu Asp Ala Tyr Gly Asn Arg Pro Leu Ile Ala
 645 650 655
 Gln Ala Asp Gln Asn Ala Pro Arg Val Pro Ala Ala Arg Leu Gly Val
 660 665 670
 His Leu Lys Ala Ser Leu Thr Asp Arg Ile Asp Ala Asn Leu Asp Tyr
 675 680 685
 Tyr Arg Val Phe Ala Gln Asn Lys Leu Ala Arg Tyr Glu Thr Arg Thr
 690 695 700
 Pro Gly His His Met Leu Asn Leu Gly Ala Asn Tyr Arg Arg Asn Thr
 705 710 715 720
 Arg Tyr Gly Glu Trp Asn Trp Tyr Val Lys Ala Asp Asn Leu Leu Asn
 725 730 735
 Gln Ser Val Tyr Ala His Ser Ser Phe Leu Ser Asp Thr Pro Gln Met
 740 745 750
 Gly Arg Ser Phe Thr Gly Gly Val Asn Val Lys Phe
 755 760

<210> 3

<211> 720

<212> PRT

<213> Neisseria gonorrhoeae

<400> 3

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 20 25 30
 Thr Val Thr Val Lys Gly Asp Arg Gln Gly Ser Lys Ile Arg Thr Asn
 35 40 45
 Ile Val Thr Leu Gln Gln Lys Asp Glu Ser Thr Ala Thr Asp Met Arg
 50 55 60
 Glu Leu Leu Lys Glu Glu Pro Ser Ile Asp Phe Gly Gly Gly Asn Gly
 65 70 75 80
 Thr Ser Gln Phe Leu Thr Leu Arg Gly Met Gly Gln Asn Ser Val Asp
 85 90 95

Ile	Lys	Val	Asp	Asn	Ala	Tyr	Ser	Asp	Ser	Gln	Ile	Leu	Tyr	His	Gln	
			100					105					110			
Gly	Arg	Phe	Ile	Val	Asp	Pro	Ala	Leu	Val	Lys	Val	Val	Ser	Val	Gln	
		115					120					125				
Lys	Gly	Ala	Gly	Ser	Ala	Ser	Ala	Gly	Ile	Gly	Ala	Thr	Asn	Gly	Ala	
		130				135					140					
Ile	Ile	Ala	Lys	Thr	Val	Asp	Ala	Gln	Asp	Leu	Leu	Lys	Gly	Leu	Asp	
145					150				155						160	
Lys	Asn	Trp	Gly	Val	Arg	Leu	Asn	Ser	Gly	Phe	Ala	Ser	Asn	Glu	Gly	
			165						170					175		
Val	Ser	Tyr	Gly	Ala	Ser	Val	Phe	Gly	Lys	Glu	Gly	Asn	Phe	Asp	Gly	
			180					185					190			
Leu	Phe	Ser	Tyr	Asn	Arg	Asn	Asp	Glu	Lys	Asp	Tyr	Glu	Ala	Gly	Lys	
		195				200						205				
Gly	Phe	Arg	Asn	Val	Asn	Gly	Gly	Lys	Thr	Val	Pro	Tyr	Ser	Ala	Leu	
		210				215					220					
Asp	Lys	Arg	Ser	Tyr	Leu	Ala	Lys	Ile	Gly	Thr	Thr	Phe	Gly	Asp	Asp	
225					230					235					240	
Asp	His	Arg	Ile	Val	Leu	Ser	His	Met	Lys	Asp	Gln	His	Arg	Gly	Ile	
			245						250					255		
Arg	Thr	Val	Arg	Glu	Glu	Phe	Thr	Val	Gly	Asp	Lys	Ser	Ser	Arg	Ile	
		260						265					270			
Asn	Ile	Asp	Arg	Gln	Ala	Pro	Ala	Tyr	Arg	Glu	Thr	Thr	Gln	Ser	Asn	
		275				280							285			
Thr	Asn	Leu	Ala	Tyr	Thr	Gly	Lys	Asn	Leu	Gly	Phe	Val	Glu	Lys	Leu	
		290				295					300					
Asp	Ala	Asn	Ala	Tyr	Val	Leu	Glu	Lys	Glu	Arg	Tyr	Ser	Ala	Asp	Asp	
305					310					315					320	
Ser	Gly	Thr	Gly	Tyr	Ala	Gly	Asn	Val	Lys	Gly	Pro	Asn	His	Thr	Arg	
			325						330					335		
Ile	Thr	Thr	Arg	Gly	Ala	Asn	Phe	Asn	Phe	Asp	Ser	Arg	Leu	Ala	Glu	
			340					345					350			
Gln	Thr	Leu	Leu	Lys	Tyr	Gly	Ile	Asn	Tyr	Arg	His	Gln	Glu	Ile	Lys	
		355				360						365				
Pro	Gln	Ala	Phe	Leu	Asn	Ser	Lys	Phe	Ser	Ile	Pro	Thr	Thr	Glu	Glu	
		370				375					380					
Lys	Asn	Gly	Gln	Lys	Val	Asp	Lys	Pro	Met	Glu	Gln	Gln	Met	Lys	Asp	
385					390					395					400	
Arg	Ala	Asp	Glu	Asp	Thr	Val	His	Ala	Tyr	Lys	Leu	Ser	Asn	Pro	Thr	
			405						410					415		
Lys	Thr	Asp	Thr	Gly	Val	Tyr	Val	Glu	Ala	Ile	His	Asp	Ile	Gly	Asp	
			420					425					430			
Phe	Thr	Leu	Thr	Gly	Gly	Leu	Arg	Tyr	Asp	Arg	Phe	Lys	Val	Lys	Thr	
		435					440					445				
His	Asp	Gly	Lys	Thr	Val	Ser	Ser	Ser	Asn	Leu	Asn	Pro	Ser	Phe	Gly	
		450				455					460					
Val	Ile	Trp	Gln	Pro	His	Glu	His	Trp	Ser	Phe	Ser	Ala	Ser	His	Asn	
465					470					475					480	
Tyr	Ala	Ser	Arg	Ser	Pro	Arg	Leu	Tyr	Asp	Ala	Leu	Gln	Thr	His	Gly	
			485						490					495		
Lys	Arg	Gly	Ile	Ser	Ile	Ala	Asp	Gly	Thr	Lys	Ala	Glu	Arg	Ala		
		500					505					510				
Arg	Asn	Thr	Glu	Ile	Gly	Phe	Asn	Tyr	Asn	Asp	Gly	Thr	Phe	Ala	Ala	
		515					520					525				
Asn	Gly	Ser	Tyr	Phe	Trp	Gln	Thr	Ile	Lys	Asp	Ala	Leu	Ala	Asn	Pro	
		530				535					540					
Gln	Asn	Arg	His	Asp	Ser	Val	Ala	Val	Arg	Glu	Ala	Val	Asn	Ala	Gly	
545					550					555					560	

Tyr Ile Lys Asn His Gly Tyr Glu Leu Gly Ala Ser Tyr Arg Thr Gly
 565 570 575
 Gly Leu Thr Ala Lys Val Gly Val Ser His Ser Lys Pro Arg Phe Tyr
 580 585 590
 Asp Thr His Lys Asp Lys Leu Leu Ser Ala Asn Pro Glu Phe Gly Ala
 595 600 605
 Gln Val Gly Arg Thr Trp Thr Ala Ser Leu Ala Tyr Arg Phe Gln Asn
 610 615 620
 Pro Asn Leu Glu Ile Gly Trp Arg Gly Arg Tyr Val Gln Lys Ala Thr
 625 630 635 640
 Gly Ser Ile Leu Ala Ala Gly Gln Lys Asp Arg Lys Gly Asn Leu Glu
 645 650 655
 Asn Val Val Arg Lys Gly Phe Gly Val Asn Asp Val Phe Ala Asn Trp
 660 665 670
 Lys Pro Leu Gly Lys Asp Thr Leu Asn Val Asn Leu Ser Val Asn Asn
 675 680 685
 Val Phe Asn Lys Phe Tyr Tyr Pro His Ser Gln Arg Trp Thr Asn Thr
 690 695 700
 Leu Pro Gly Val Gly Arg Asp Val Arg Leu Gly Val Asn Tyr Lys Phe
 705 710 715 720

<210> 4

<211> 525

<212> PRT

<213> Neisseria gonorrhoeae

<400> 4

Met Arg Ala Asn Pro Lys Thr Gln Ala Met Pro Ser Glu Thr Ile Ser
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 Leu Met Lys Thr Arg Ser Leu Ile Ser Leu Leu Cys Leu Leu Cys
 20 25 30
 Ser Cys Ser Ser Trp Leu Pro Pro Leu Glu Glu Arg Thr Glu Ser Arg
 35 40 45
 His Phe Asn Thr Ser Lys Pro Val Arg Leu Asp Asn Ile Leu Gln Ile
 50 55 60
 Arg His Thr Pro His Thr Asn Gly Leu Ser Asp Ile Tyr Leu Leu Asn
 65 70 75 80
 Asp Pro His Glu Ala Phe Ala Ala Arg Ala Ala Leu Ile Glu Ser Ala
 85 90 95
 Glu His Ser Leu Asp Leu Gln Tyr Tyr Ile Trp Arg Asn Asp Ile Ser
 100 105 110
 Gly Arg Leu Leu Phe Asn Leu Val Tyr Leu Ala Ala Glu Arg Gly Val
 115 120 125
 Arg Val Arg Leu Leu Leu Asp Asp Asn Asn Thr Arg Gly Leu Asp Asp
 130 135 140
 Leu Leu Leu Ala Leu Asp Ser His Pro Asn Ile Glu Val Arg Leu Phe
 145 150 155 160
 Asn Pro Phe Val Leu Arg Lys Trp Arg Ala Leu Gly Tyr Leu Thr Asp
 165 170 175
 Phe Pro Arg Leu Asn Arg Arg Met His Asn Lys Ser Phe Thr Ala Asp
 180 185 190
 Asn Arg Ala Thr Ile Leu Gly Gly Arg Asn Ile Gly Asp Glu Tyr Phe
 195 200 205
 Lys Val Gly Glu Asp Thr Val Phe Ala Asp Leu Asp Ile Leu Ala Thr
 210 215 220
 Gly Ser Val Val Gly Glu Val Ser His Asp Phe Asp Arg Tyr Trp Ala
 225 230 235 240

Ser His Ser Ala His Asn Ala Thr Arg Ile Ile Arg Ser Gly Asn Ile
 245 250 255
 Gly Lys Gly Leu Gln Ala Leu Gly Tyr Asn Asp Glu Thr Ser Arg His
 260 265 270
 Ala Leu Leu Arg Tyr Arg Glu Thr Val Glu Gln Ser Pro Leu Tyr Gln
 275 280 285
 Lys Ile Gln Thr Gly Arg Ile Asp Trp Gln Ser Val Gln Thr Arg Leu
 290 295 300
 Ile Ser Asp Asp Pro Ala Lys Gly Leu Asp Arg Asp Arg Arg Lys Pro
 305 310 315 320
 Pro Ile Ala Gly Arg Leu Gln Asp Ala Leu Lys Gln Pro Glu Lys Ser
 325 330 335
 Val Tyr Leu Val Ser Pro Tyr Phe Val Pro Thr Lys Ser Gly Thr Asp
 340 345 350
 Ala Leu Ala Lys Leu Val Gln Asp Gly Ile Asp Val Thr Val Leu Thr
 355 360 365
 Asn Ser Leu Gln Ala Thr Asp Val Ala Ala Val His Ser Gly Tyr Val
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 Lys Tyr Arg Lys Pro Leu Leu Lys Ala Gly Ile Lys Leu Tyr Glu Leu
 385 390 395 400
 Gln Pro Asn His Ala Val Pro Ala Thr Lys Asp Lys Gly Leu Thr Gly
 405 410 415
 Ser Ser Val Thr Ser Leu His Ala Lys Thr Phe Ile Val Asp Gly Lys
 420 425 430
 Arg Ile Phe Ile Gly Ser Phe Asn Leu Asp Pro Arg Ser Ala Arg Leu
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 Asn Thr Glu Met Gly Val Val Ile Glu Ser Pro Lys Ile Ala Glu Gln
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 Met Glu Arg Thr Leu Ala Asp Thr Ser Pro Glu Tyr Ala Tyr Arg Val
 465 470 475 480
 Thr Leu Asp Arg His Asn Arg Leu Gln Trp His Asp Pro Ala Thr Arg
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<212> PRT

<213> *Neisseria gonorrhoeae*

<400> 5

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 Thr Ala Ser Leu Asn Lys His Thr Cys Arg Ser Tyr Arg Gly Ser Phe
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 Leu Ser Leu Glu Lys Ile Gly Leu Leu Ser Leu Asp Met Asn Leu Gln
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 Glu Phe Ser Leu Leu Asn His Asn Leu Ile Leu Asp Ala Ile Lys Lys
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 Val Ser Ser Ala Lys Thr Ser Trp Thr Glu Gly Thr Lys Gln Val Arg
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Gln Thr Ala Ser Phe Leu Lys Glu Leu Lys Lys Ile Asn Ala Arg Asp
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Thr Tyr Pro Gln Lys Phe Met His Phe Leu Gln Glu Tyr Ile Gly Gln
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Arg Arg Gly Phe Val Phe Val Thr Arg Ser Gly Lys Met Val Gly Leu
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Pro Phe Lys Ile Thr Pro His Val Leu Arg Ala Thr Ala Val Thr Glu
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Tyr Lys Arg Leu Gly Cys Ser Asp Ser Asp Ile Met Lys Val Thr Gly
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<211> 6048

<212> DNA

<213> Neisseria gonorrhoeae

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<211> 2295

<212> DNA

<213> *Neisseria gonorrhoeae*

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<212> DNA

<213> *Neisseria gonorrhoeae*

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 <213> Neisseria gonorrhoeae

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 Val Met Glu Gln Phe Lys Lys Ser Lys Thr Leu Phe Ser Leu Met Gln
 35 40 45
 Tyr Ser Asp Glu Phe Arg Ile His Phe Thr Phe Asn Asp Phe Lys Arg
 50 55 60
 Asn Pro Ser Pro Arg Ser His Val Ser Pro Ile Lys Gln Leu Asn Gly
 65 70 75 80
 Arg Thr Lys Thr Ala Ser Gly Ile Arg Lys Val Val Arg Glu Leu Phe
 85 90 95
 His Lys Thr Asn Gly Ala Arg Glu Asn Ala Ala Lys Ile Leu Val Val
 100 105 110
 Ile Thr Asp Gly Glu Lys Phe Gly Asp Pro Leu Asp Tyr Lys Asp Val
 115 120 125
 Ile Pro Glu Ala Asp Arg Ala Gly Val Ile Arg Tyr Val Ile Gly Val
 130 135 140
 Gly Asn Ala Phe Asn Lys Pro Gln Ser Arg Arg Glu Leu Asp Thr Ile
 145 150 155 160
 Ala Ser Lys Pro Ala Gly Glu His Val Phe Gln Val Asp Asn Phe Glu
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